

AMENDMENT TO THE CLAIMS

Please replace the present claims with the following amended claims:

1. (Currently Amended) Signal processing method using a MAP (Maximum A Posteriori) type algorithm to determine a likelihood ratio Λ_k^x of a set of states X of a lattice at instant k, each of the said states being associated with at least one intermediate variable, belonging to the group including a so-called "forward" variable and a so-called "backward" variable, propagated by the said MAP algorithm and calculated recursively, in a direct direction and in an indirect direction respectively at the said instant k with respect to the said lattice, wherein the method comprises:

reducing the number of states selected by the said MAP type algorithm so as to calculate the said likelihood ratio; ~~and~~

calculating said likelihood ratio for the selected states;

assigning at least one determined value to the corresponding said forward and/or backward variable, so as to calculate an approximate likelihood ratio, at least for some non-selected states; and

calculating said approximate likelihood ratio at least for some non-selected states.

2. (Previously Presented) Method according to claim 1, wherein at a given instant K, the said at least one determined value $a(k)$ assigned to the said forward variable is such that $0 \leq a(k) \leq \min_{i \in M_i^f} (a_i^k)$, and/or the said at least one determined value $b(k)$ assigned to the said backward variable is such that $0 \leq b(k) \leq \min_{i \in M_i^b} (\beta_i^k)$, where M_k^f and M_k^b represent a set of the said states selected in the said direct direction and in the said indirect direction respectively at the said instant k, and where a_i^k and β_i^k represent the said forward and backward variables respectively at the said instant k.

3. (Previously Presented) Method according to claim 2, wherein at a given instant k, the said

determined value $a(k)$ and/or $b(k)$ is unique and is assigned to at least one forward variable a_i^k and/or backward variable β_i^k .

4. (Previously Presented) Method according to claim 1, wherein a constant value is assigned to the said forward and backward variables respectively, such that the said MAP type algorithm is a single-directional direct or indirect type algorithm respectively.

5. (Previously Presented) Method according to claim 1, wherein the said step to reduce the number of states uses a "breadth-first" type lattice search algorithm.

6. (Previously Presented) Method according to claim 5, wherein the said "breadth-first" type algorithm is an M type algorithm.

7. (Previously Presented) Method according to claim 5, wherein the said "breadth-first" type algorithm is a T type algorithm using at least one threshold.

8. (Previously Presented) Method according to claim 7, wherein the said at least one threshold is variable as a function of the said instant k .

9. (Previously Presented) Method according to claim 8, wherein a predetermined value is assigned to the said variable threshold for each instant k .

10. (Previously Presented) Method according to claim 8, wherein for each instant k , the value of the said variable threshold is determined by the use of an adaptive algorithm.

11. (Previously Presented) Method according to claim 10, wherein the said adaptive algorithm is a gradient type algorithm.

12. (Previously Presented) Method according to claim 10, wherein since the said lattice comprises a plurality of nodes each associated with one of the said states and at a given instant k , the value of the said variable threshold T at an instant $(k+1)$ is determined by the following equation:

$$T(k+1) = T(k) - \mu(M(k) - M_c)$$

where $T(k)$ represents the value of the said variable

threshold at the said instant k , M_c is the target number of propagated nodes in the said lattice, $M(k)$ is the number of propagated nodes in the said lattice at instant k , and μ is a positive constant representing a learning gain.

13. (Previously Presented) Method according to claim 11, wherein the said adaptive algorithm is a gradient type algorithm with variable pitch.

14. (Previously Presented) Method according to claim 12, wherein the said learning gain μ is a function of the said instant k .

15. (Previously Presented) Method according to claim 2, wherein the said step to reduce the number of states uses an M type "breadth-first" lattice search algorithm, and the said determined values $a(k)$ and/or $b(k)$ assigned to the said "forward" and/or "backward" variables respectively, at a given instant k are given by the following equations:

$$a(k) = \min_{i \in M_f^k} (a_i^k) - c_f$$

$$b(k) = \min_{i \in M_b^k} (\beta_i^k) - c_b$$

where c_f and c_b are two positive constants.

16. (Previously Presented) Method according to claim 2, wherein the said step to reduce the

number of states uses a T type "breadth-first" lattice search algorithm, and the said determined values $a(k)$ and/or $b(k)$ assigned to the said forward and/or backward variables at a given instant k respectively, are given by the following equations:

$$a(k) = T^f(k) - c_f$$

$$b(k) = T^b(k) - c_b$$

where c_f and c_b are two positive constants, and where

$T^f(k)$ and $T^b(k)$ denote the value of the said variable

threshold at said instant k in the said direct direction and in the said indirect direction respectively.

17. (Previously Presented) Method according to claim 1 the said MAP type algorithm belongs to the group consisting of:

- MAP type algorithms;
- Log-MAP type algorithms; and
- Max-Log-MAP type algorithms.

18. (Previously Presented) Method according to claim 4, wherein since the said MAP type algorithm is a single-directional algorithm, the said method uses a step to compare decisions made by the said single-directional algorithm with the corresponding decisions made by a Viterbi type algorithm, called Viterbi decisions.

19. (Previously Presented) Method according to claim 18, wherein in the case of a negative comparison for at least one of the said decisions made by the said single-directional algorithm, the said method uses a substitution step for the said Viterbi decision corresponding to the said decision made by the said single-directional algorithm, called the substituted decision.

20. (Previously Presented) Method according to claim 19, wherein a determined value V is

assigned to the absolute value of the said likelihood ration associated with the said substituted decision.

21. (Previously Presented) Method according to claim 20, wherein the said determined value V is equal to the absolute value of the average likelihood ratio of the sequence.

22. (Previously Presented) Method according to claim 18, wherein in the case of a negative comparison for at least one of the said decisions made by the said single-directional algorithm, the said method uses a step for weighting the said likelihood ratio associated with the said decision considered, taking account of the said Viterbi decision.

23. (Previously Presented) Method according to claim 22, wherein when Y is a set of states associated with a decision D_i^Y output by the said Viterbi type algorithm at instant i , and Λ_i^Y represents the likelihood ratio associated with Y at instant i as calculated by the said single-directional algorithm during the said weighting step, the value of Λ_i^Y is replaced by the $\tilde{\Lambda}_i^Y$ defined by $\tilde{\Lambda}_i^Y = \Lambda_i^Y + D_i^Y \times V$, where V is a determined value.

24. (Previously Presented) The method of claim 1 and further comprising performing said method in a domain belonging to the group consisting of:

- symbol detection;
- signal coding/decoding;
- turbo-decoding;
- turbo-detection; and
- source coding by quantification in lattice.

25. (Currently Amended) A communication signals receiver comprising means for implementing a MAP (Maximum A Posteriori) type algorithm to determine a likelihood ratio

Λ_k^x of a set of states X of a lattice at instant k , wherein each of the said states is associated with at least one intermediate variable belonging to the group comprising a so-called "forward" variable and a so-called "backward" variable propagated by the said MAP algorithm and calculated recursively in a direct direction and in an indirect direction respectively at the said instant k with respect to the said lattice, wherein the means for implementing the MAP type algorithm further comprises:

means of reducing the number of states selected by the said MAP type algorithm in order to make a calculation of the said likelihood ratio,

means of calculating said likelihood ratio for the selected states, for at least some non-selected states,

means for assigning at least one determined value to the corresponding said forward variable and/or backward variable, so as to calculate an approximate likelihood ratio,

means of calculating said approximate likelihood ratio at least for some non-selected states.